PRESENTER INFORMATION

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BIOGRAPHICAL SKETCH

Dr. Alexander Tesler is currently a Postdoctoral Fellow at the Friedrich-Alexander University of Erlangen-Nuremberg. He received his B.Sc. and M.Sc. degrees in Chemical Engineering from the Technion - Israel Institute of Technology, and a Ph.D. in Chemistry of the Department of Materials and Interfaces from Weizmann Institute of Science under the supervision of Prof. Israel Rubinstein. Alter graduation, he spent several years at Wyss Institute for Bioinspired Engineering and School of Engineering and Applied Sciences at Harvard University studying mechanically durable omniphobic slippery surfaces. His scientific interests are spread from the formation of, mechanically durable omniphobic surfaces, self-assembly monolayers, plasmonic materials, membrane technology to electrochemical methods to create smart highly-ordered self-organized nanomaterials.

TITLE Non-Wettable Ultra Slippery Surfaces

ABSTRACT

Wetting describes the ability of liquids to maintain contact with a solid surface, a phenomenon that is ubiquitous in nature. However, in engineering and medical applications, contact of solid surfaces with aqueous media leads to undesirable phenomena such as corrosion, chemo- and biofouling, which have extremely negative economic, health and environmental impacts. Therefore, control of wetting on solid surfaces is key to mitigating its detrimental effects. The latter can be achieved by minimizing the contact of the solid substrate with aqueous media, so-called superhydrophobic surfaces (SHS). Although SHS have been studied for decades to overcome wetting challenges, they are still rarely used in engineering applications.

When immersed underwater, a special type of SHS can trap air on its surface, a so-called plastron, also known as an aerophilic surface. To date, plastrons have been reported to be impractical for underwater engineering applications due to their short lifetime. Here, I will describe aerophilic surfaces made of titanium alloy (Ti) with an extended lifetime of plastron conserved for months underwater. The extended methodology was developed to unambiguously describe the wetting regime on such aerophilic surfaces since conventional goniometric measurements are simply impractical. My aerophilic surfaces drastically reduce the adhesion of blood, and when immersed in aqueous media, prevent the adhesion of bacteria, and marine organisms such as barnacles, and mussels. Applying thermodynamic stability theories, we describe a generic strategy to achieve long-term stability of plastron on aerophilic surfaces for demanding and hitherto unattainable applications.